

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) Publication number:

0 333 858 B1

(12)

EUROPEAN PATENT SPECIFICATION(45) Date of publication of patent specification: 03.02.93 (51) Int. Cl.⁵: **A23L 1/307**(21) Application number: **87906943.3**(22) Date of filing: **26.10.87**(86) International application number:
PCT/JP87/00821(87) International publication number:
WO 88/02992 (05.05.88 88/10)(54) **FOOD FOR CONTROLLING CALORIE INTAKE.**(30) Priority: **27.10.86 JP 253669/86**
30.06.87 JP 161096/87(43) Date of publication of application:
27.09.89 Bulletin 89/39(45) Publication of the grant of the patent:
03.02.93 Bulletin 93/05(84) Designated Contracting States:
BE CH DE FR GB IT LI NL SE(56) References cited:
EP-A- 0 176 113 EP-A- 0 251 925
EP-A- 0 323 510 WO-A-86/03380
FR-A- 2 317 884 JP-A- 5 411 256
JP-A- 6 229 947 US-A- 4 119 734
US-A- 4 585 664(73) Proprietor: **TERUMO KABUSHIKI KAISHA**
No. 44-1, Hatagaya 2-chome, Shibuya-ku
Tokyo 151(JP)(72) Inventor: **OHTA, Atsutane Terumo Kabushiki**
Kaisha
44-1, Hatagaya 2-chome
Shibuya-ku Tokyo 151(JP)
Inventor: **WATANABE, Hiroyuki Room A-202,**
Miyakoshi-Heights 345-5, Ohaza-Shirokuwa
Urawa-shi, Saitama 338(JP)(74) Representative: **Gillard, Marie-Louise et al**
Cabinet Beau de Loménie 55, Rue
d'Amsterdam
F-75008 Paris(FR)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

Technical Field

5 The present invention relates to calorie intake-controlling food. More particularly, it is concerned with calorie intake-controlling food containing low-calorie cereals, a dietary fiber and protein. The food is favorably used as food for patients with obesity or diabetes mellitus because of its calorie being 1/2 or less as much as that of gruel and its longer retention in the stomach.

10 Background of Art

As obesity patients rapidly increase in recent years, obesity is becoming a serious problem in social health. As onset of obesity is caused by excessive calorie intake in most cases, the most effective means for the prevention and the therapy is to reduce calorie intake.

15 In some of the calorie-intake restriction an intake of gruel, a porridge of rice and vegetables is applied. Such method is based upon reduction of the level of calorie per unit weight due to swelling of rice grains by absorption of a large amount of water in preparing gruel from cooked rice.

However, as starch which constitutes the major portion of the saccharide is converted to the α -type when gruel is prepared from cooked rice, the starch becomes more digestible and is provided with a higher 20 utilizability in the body with a result that calorie intake-restricting effect is hardly produced. Moreover, the processing to gruel or the like is disadvantageous in that it rather facilitates digestion thereby promptly producing hunger sensation. Moreover, gruel heretofore employed is disadvantageous in that it browns or undergoes collapse of the cereal grains when stored for a longer period of time.

On the other hand, there is applied reduction in calorie intake per unit weight by giving a dietary fiber 25 alone or in combination with other foods.

Attention has recently been called to dietary fibers because of their action improving saccharide or lipid metabolism.

However, dietary fibers have disadvantages of being unfavorable in taste or feeling on intake so that it is difficult to take the material alone, and when used in combination, greatly deteriorating taste or texture on 30 intake of most of the foods to which the material has been added.

A low-calorie boiled cereal with a reduced content in carbohydrate component prepared by adding to a boiled cereal water or diluted acid heated at at least 60°C, warming the mixture at at least 60°C for 1 to 30 min while maintaining the viscosity of the water or diluted aqueous acid at 0.2 Pa.s or below, and then removing the solution, is disclosed in EP 0 251 925.

35 EP 0 323 510 relates to a food composition which comprises water-soluble edible fibers such as carrageenan and guar gums, and proteins having an isoelectric point in an acidic region, such as casein and its salts, in a weight ratio of fibers to proteins of about 1 : 0.5 to 1 : 8, and which gels when in contact with gastric juice.

EP 0 251 925 and EP 0 323 510 are intermediate documents falling within the terms of Article 54(3) 40 EPC.

Disclosure of the Invention

45 An object of the invention is to provide calorie intake-controlling food which has appearance, taste and texture on intake similar to those of gruel, contains a very low level of calorie per unit weight and produces a long duration of the feeling of full stomach after taken.

We have found that the above-mentioned object is achieved with food containing low-calorie cereals produced by removing by extract of saccharide from cooked cereals, and a water-soluble dietary fiber and protein in predetermined proportions. The present invention has been completed on the basis of the above 50 finding.

These is provided by the invention food containing low-calorie cereals with a reduced content of carbohydrates, particularly saccharide, a water-soluble dietary fiber and protein having an isoelectric point in acidic region.

As examples of the cereals used in the invention are mentioned rice, barley, wheat, oats and rye, foxtail 55 millet, Japanese barnyard millet and the like.

When rice is employed as the starting cereals in the invention, it may be in either full-grain or crushed form of hushed rice, half milled rice, 70 % milled rice, milled rice, polished rice with germ, alfa rice and the like, all being distributed on the market in the form of raw rice.

A process for preparing low-calorie cereals using rice will be described below. The process may also be applied when using starting cereals other than rice.

First, washed raw rice is cooked in a vessel such as pressure pan, electric pan or ordinary pan by conventional procedures. To the cooked rice is added water or a diluted solution of an acid such as acetic or phosphoric acid heated to a temperature of 60 °C or higher in a sufficient amount, and the mixture is gently heated with stirring. Adequate concentration of the diluted acid solution is 0.025 - 0.5 % (v/v). After the heating with stirring is continued for a period of time from 1 min. to 30 min., the solution layer is removed by filtration or decantation. Temperature below 60 °C for the water or diluted solution of an acid such as acetic or phosphoric acid will not be favorable because desaccharization from the rice does not proceed rapidly. The rice grains are swelled from 1.5 to 2.5-fold without disintegration of the grains by such high-temperature and short-time treatment. The above procedures are repeated one to several times, and the calorie level per unit weight is reduced by approximately 50 % as compared with the original cooked rice due to removal by extract of saccharide into the solution layer. Calorie level per unit weight of the rice grains is also reduced to approximately 1/4 of the original level due to swelling of the grains by absorption of water.

The removal of saccharide by extraction may also be conducted in an extraction vessel by perfusing water or a diluted solution of an acid such as acetic or phosphoric acid heated to a temperature of 60 °C or higher.

In the preparation of desaccharized cooked rice it is necessary to maintain viscosity of the saccharide extract below 0.2 Pa.s (200 cP) during the extracting process. As a matter of fact, if viscosity of the extract is increased beyond the above, shear force to the cooked rice grains will be greater to induce disintegration of the grains, and in addition, separation of the cooked rice grains from the extract will become difficult.

It is difficult to separate cooked rice grains from liquid layer by a 20-mesh screen even with ordinary 50 %-concentrated gruel. In this respect, comparison was made for screen permeability and degree of gruel formation under various conditions of the viscosity of the extract. To 650 g of washed milled rice was added 1 l of water, and the mixture was cooked in an electric pan in a conventional manner to produce 1,450 g of cooked rice. The rice were divided in six 3-l pans each in an amount of 350 g, and water was added to the pan respectively in an amount of 0.5, 0.75, 1.0, 1.25, 1.5 or 2 l. The rice was stewed for 30 min. The six samples thus obtained were comparatively determined for screen permeability and degree of gruel formation. Results are shown in Table 1. As shown in Table 1, when viscosity of the extract is 0,2 Pa.s (200 cP) or lower, preferably 0,1 Pa.s (100 cP) or lower, the cooked rice grains are hardly disintegrated, and separation of the cooked rice grains from the liquid layer is easy.

Table 1

Amount of water added	Screen permeability			Viscosity Pa.s (cP)	Degree of gruel formation
	20 mesh	35 mesh	100 mesh		
0.5	X	X	X	Not measurable	Gruel formed
0.75	○	X	X	0,21 (210)	Gruel formed
1.0	○	X	X	0,152 (152)	
1.25	⊙	○	○	0,062 (62)	
1.5	⊙	⊙	⊙	0,025 (25)	
2.0	⊙	⊙	⊙	0,018 (18)	
Screen permeability					
X ... Poor					
○ ... Good					
⊙ ... Excellent					

Remaining proportion of the carbohydrates can usually be maintained at a level of 80% by weight or lower by such process.

The dietary fiber used in the invention is a water-soluble one and desirably carrageenan or guar gum. Carrageenan is especially desirable. Attention has been called to dietary fibers in recent years because of their action of improving saccharide or lipid metabolism.

The protein used in the invention is one having an isoelectric point in acidic region and is desirably casein or a salt thereof (preferably the salt with an alkali metal such as sodium or potassium) or soy protein.

The acid region in the invention means one at a pH lower than 7. Ratio of the water-soluble dietary fiber to the protein is such that an aqueous solution of the composition of the invention will be in gel form when contacted with gastric juice. Such ratio is about 1:0.5 - 1:8 by weight (on dry basis), although it is variable depending upon nature and combination of the water-soluble dietary fiber and the protein.

If amount (by weight) of the protein is less than 0.5 time that of the water-soluble dietary fiber, the aqueous solution of the composition of the invention will remain liquid without formation of gel. If it is more than 8-fold as much, the protein will precipitate and be separated from the water-soluble dietary fiber thereby resulting in no formation of gel.

It has been found that when the present composition having weight ratio of 1:0.5 - 1:2 of the above-mentioned dietary fiber to the protein gels in stomach, migration of saccharide into the gel is high. Therefore, the gel absorbs the saccharide contained in other foods including the low-calorie cereals coexisting in the stomach thereby delaying absorption of such saccharide into the body and being capable of preventing rapid rise of the glucose level in patients with disease such as diabetes mellitus.

The food according to the invention is composed of 1 - 100, preferably 10 - 30 parts by weight (on dry basis) of the low-calorie cereals per part by weight of the dietary fiber plus the protein. If amount of the low-calorie cereals is lower than the above-defined one, the person who has taken the food will not be given feeling of full stomach. If it exceeds the above-defined ratio, gel formation surrounding cooked rice grains in the stomach will become difficult.

The food of the invention is produced by adding to low-calorie cereals an aqueous solution containing 0.1 - 10 % (w/v) of the dietary fiber and 0.1 - 10 % (w/v) of one or more of the proteins respectively at predetermined proportions and heating the mixture with stirring. Temperature in the above operation is desirably 60 °C or higher in general, although it is variable depending upon solubility of the dietary fiber employed, and the heating time is desirably from 1 min. to 5 min.

The food of the invention may be taken without further processing or may be dried for preservation by a conventional method such as freeze drying. When processed to a dry food, it is dissolved in hot water on use and taken in the form of aqueous solution. In the latter scheme, total concentration of the dietary fiber plus the protein is approximately 0.5 - 5 w/v %. At a concentration less than 0.5 %, gel formation in the stomach will not satisfactorily occur. At a concentration more than 5 %, gelatinized food is produced with difficulty to be taken.

To the food of the invention may be added seasonings and spices provided that the addition will not cause departure from the objects of the invention. As the seasoning may be used one or more in combination of any usually employed seasonings including salt, soy sauce, sodium glutamate, vinegar, sweat sake, sake and miso. As the spices may be used one or more in combination of any usually employed spices including mustard, garlic, curry and pepper.

The materials used in the invention are of poor taste and may therefore be given various tastes by the addition of a small amount of seasonings. Accordingly, the food can be given to patients without trouble even when they are under salt restriction as part of the treatment.

Other nutrient constitutions such as, for example, carbohydrates, vitamins and minerals may also be added.

Thus, calorie intake-controlling food provided with the same appearance, taste and feeling on intake as with ordinary gruel, being of a very low calorie level per unit weight and producing a long duration of the feeling of full stomach can be obtained.

Calorie intake can easily be controlled by appropriately increasing or decreasing amount of the cereals contained in the composition of the invention.

The cereals used in the invention can be stored for a long period of time with little yellowing or disintegration of cereal grains associated. The food of the invention is stored preferably after tightly sealed in a container such as aluminum pack and retort sterilized.

As described above in details, the calorie intake-controlling food of the invention contains low-calorie cereals with content of carbohydrates, especially saccharide reduced, a water-soluble dietary fiber and protein having an isoelectric point in acidic region, contents of said water-soluble dietary fiber and said protein being in such proportions as forming gel when contacted with gastric juice. Consequently, it is useful as low-calorie food for prevention or treatment of obesity as well as for treatment of diabetes mellitus.

Calorie intake from the food of the invention can be adjusted to various levels without decreasing volume of the food by preparing 30 %-, 50 %- or 100 %-concentrated gruel form which is formed by increasing or decreasing content of the cereals.

The low-calorie cereals used in the invention is a cooked product with the carbohydrate content, especially saccharide content removed by very simple equipment and operation. As the removal of carbohydrates is accomplished under conditions set to cause no collapse of the shape of grains, the food

product possesses the same appearance and texture in mouth as with the gruel.

With a water-soluble dietary fiber and protein having an isoelectric point in acidic region contained, the viscosity is increased up to 50-fold as high as the initial one on intake due to the decrease in temperature from the initial level on intake to the level after intake (in the stomach) and the pH reduction with secretion of gastric juice. As retention time of the content in the stomach is usually prolonged as its viscosity is increased, mechanical stimulation to the stomach for extension is produced over a long period of time when food of the composition of the invention dissolved in water is taken prior to or together with meal even if a small amount of the meal is taken. Consequently, appetite is inhibited and eventually overeating is prevented. In addition, as the viscosity grows much higher in the stomach, the food may be in low viscosity at the time of intake, which allows for easier intake and better palatability than prior-art products.

In conclusion, the food according to the present invention is a calorie intake-controlling food having the same appearance, taste and mouth-feel as with the ordinary gruel, being of a very low calorie level per unit weight and producing a long duration of the feeling of full stomach.

Moreover, there is obtained according to the invention calorie intake-controlling food capable of being stored over a long period of time.

The invention will be described in more detail below with reference to examples and test examples.

Example 1.

To 210 g of washed milled rice (717 Kcal) was added 315 ml of water, and the mixture was cooked in an electric pan to prepare 460 g of cooked rice. The cooked rice was placed in 5 l of boiling water, and the mixture was heated with gentle stirring for 20 min. The supernatant was then filtered off to produce 700 g of desaccharized cooked rice. Calorie level of the desaccharized cooked rice was reduced to 327 Kcal, representing a degree of desaccharization of 54.4 %.

Separately, 5.6 g of carrageenan and 2.8 g of sodium caseinate were dissolved in 700 ml of water. The solution was added to the above-mentioned desaccharized cooked rice, and to the resulting mixture were added 1 g of salt and 0.1 g of sodium glutamate for seasoning. There was thus obtained a product of the invention.

A sensory test and a test of duration of the feeling of full stomach were carried out in healthy volunteers for the product of the invention obtained above.

In the sensory test ordinary 50 %-concentrated gruel was used as control. The 50 %-concentrated gruel was prepared by adding 300 ml of water to 200 g of ordinary gruel, heating the mixture to a whole volume of 400 ml and adding 0.29 g of salt and 0.03 g of sodium glutamate for seasoning.

Results of the sensory test for appearance, taste and texture in mouth are shown in Table 2. Number of the volunteers in the sensory test was 18.

Table 2

	To the gruel		
	Superior	Equal	Interior
Appearance	1	14	3
Taste	3	9	6
Texture in mouth	2	13	3

As shown in Table 2, the product of the invention was estimated as being equal to the gruel in appearance, taste and texture in mouth.

Duration of the feeling of full stomach was estimated as follows: A total of 18 volunteers who usually have a meal having 500 - 800 Kcal at lunch time and dinner at 6 - 7 p.m. were employed. The volunteers were each given 350 g of the product of the invention for 100 Kcal and then tasted until 7 p.m. when degree of the hunger sensation were compared with that produced after intake of ordinary lunch.

Results are shown in Table 3.

Table 3

Degree of the hunger sensation (as compared with that after intake of ordinary lunch).						
Much stronger	Fairly stronger	Slightly stronger	Equal	Slightly weaker	Fairly weaker	Much weaker
0	1	1	3	3	4	0

As shown in Table 3, it was surprisingly observed that hunger sensation produced when the food of the invention, in spite of its calorie intake level being from 1/5 to 1/8 as low as that of ordinary lunch, was taken tended to be only slightly weaker than that when ordinary lunch was taken.

Example 2

To 2.5 kg of washed milled rice was added 4 l of water, and the mixture was cooked in an electric pan to produce 5 kg of cooked rice. The cooked rice was placed in 50 l of boiling water, and the mixture was heated with gentle stirring for 20 min. Then, the supernatant was filtered off to obtain 9 kg of desaccharized cooked rice. Separately, 50 g of carrageenan CS-215® and 60 g of calcium caseinate were dissolved in 9 l of hot water. Each of thirty 300 ml aluminum packs for retort was filled with 140 ml of the solution and 140 g of the desaccharized cooked rice, deaerated and tightly sealed by a heat sealer. There was thus obtained food of the invention.

Separately, 4 l of water was added to 2.5 kg of washed milled rice, and the mixture was cooked in an electric pan to prepare 5 kg of cooked rice. To the cooked rice was added 5.5 l of water, and the mixture was stewed for approximately 60 min. to a whole amount of 10 kg to prepare gruel. Each of thirty 300 ml aluminum packs for retort was filled with 280 g of the gruel, deaerated and tightly sealed by a heat sealer. The retort gruel thus obtained was used as control food.

The food of the invention and the control food were subjected to sterilization in a retort oven at 115 °C for 20 min. Three groups of 10 packs were then stored for 6 months under three sets of conditions, refrigerated (4 °C), at room temperature (approximately 25 °C) and at elevated temperature (37 °C), respectively. The packs were opened after the 6-months storage and sampled. There was observed disintegration of the cooked rice grains in the control food when stored at room temperature as well as at elevated temperature. Discoloration to pale yellow was also observed in some of the packs of the elevated temperature storage group. However, with the food of the invention there were observed no changes under any of the storage conditions from the states prior to initiation of the storage.

Example 3

To 210 g of washed milled rice (717 Kcal) was added 330 ml of water, and the mixture was cooked in an electric pan to prepare 490 g of cooked rice. The cooked rice was placed in 5 l of boiling water, and the mixture was heated with gentle stirring for 30 min. The supernatant was then filtered off to obtain 670 g of desaccharized cooked rice. Separately, 6.5 g of carrageenan and 40 g of sodium caseinate were dissolved in 750 ml of water. The whole of the solution was added to the above-mentioned desaccharized cooked rice, and 1.5 g of salt and 0.1 g of sodium glutamate were added to the mixture for seasoning while gently heating with stirring to 70 °C. There was thus obtained a product of the invention. To 100 g of the product of the invention placed in a 500-ml beaker was added 200 ml of artificial gastric juice (J.P. Solution I for the disintegration test, pH 2.0) heated to 40 °C followed by observation of change in physical properties of the product of the invention. As a result, it was confirmed that the product of the invention rapidly gelled when contacted with the artificial gastric juice.

Test Example 1

To 210 g of washed milled rice (717 Kcal) was added 315 ml of water, and the mixture was cooked in an electric pan to prepare 460 g of cooked rice. The cooked rice was placed in 5 l of boiling water, and the mixture was heated with gentle stirring for 20 min. The supernatant was then filtered off to obtain 680 g of desaccharized cooked rice. Calorie level of the desaccharized cooked rice was reduced to 284 Kcal, corresponding to a degree of desaccharization of 60.4 %.

Separately, 5.0 g of carrageenan and 8.0 g of sodium caseinate were dissolved in 680 ml of water. The whole of the solution was added to the above-mentioned desaccharized cooked rice, and 1 g of salt and 0.1

g of sodium glutamate were added to the mixture for seasoning while gently heating with stirring to 70 °C. There was thus obtained a product of the invention.

Ordinary 50 %-concentrated gruel was used as control. The 50 %-concentrated gruel was obtained by adding 300 ml of water to 200 g of ordinary gruel, heating the mixture to a whole volume of 400 ml and adding 0.29 g of salt and 0.03 g of sodium glutamate for seasoning.

Patients with previous abnormality of glucose tolerance were administered the product each of the invention and the control, and blood was drawn prior to, and 30 min., 60 min., 120 min. and 180 min. after the administration for the measurement of blood glucose level. Results are shown in Fig. 1. As shown in Fig. 1, rise of the blood glucose level is much smaller with the product of the invention than with the ordinary 50 %-concentrated gruel of control product. Thus, the product of the invention is very useful for patients with glucose intolerance.

As described above, it was demonstrated that the food of the invention was superior in storage stability to the ordinary gruel when processed to retort food.

Brief Description of the Drawing

Fig. 1 is a graph indicating changes of blood glucose level following administration of the food of the invention and the control food, respectively. The horizontal axis indicates time after administration of the food, and the vertical axis indicates blood glucose level. The solid circle is for the blood glucose level with the product of the invention, and the open circle is for the blood glucose level with the control food.

Industrial Applicability

The food of the invention is useful as low-calorie food for treatment and prevention of obesity as well as for treatment of diabetes mellitus.

Such food of the invention is manufactured in industrial fields such as food industry or pharmaceutical industry.

Claims

1. Calorie intake-controlling food which comprises low-calorie cereals having reduced carbohydrate content, a water-soluble dietary fiber and protein having an isoelectric point in acidic region, the cereals being contained in a predetermined amount corresponding to the calorie intake to be controlled and said water-soluble dietary fiber and said protein being in such proportions that an aqueous solution of said food is gelatinized when contacted with gastric juice.
2. Calorie intake-controlling food according to Claim 1 wherein weight ratio of the water-soluble dietary fiber to the protein is 1:0.5 - 1:8.
3. Calorie intake-controlling food according to Claim 2 wherein weight ratio of the water-soluble dietary fiber to the protein is 1:0.5 - 1:2.
4. Calorie intake-controlling food according to any of Claims 1 - 3 wherein ratio of the total weight of the water-soluble dietary fiber plus the protein to the weight of the low-calorie cereals is 1:1 - 100.
5. Calorie intake-controlling food according to Claim 1 being in gruel form.
6. Calorie intake-controlling food according to Claim 1 or 5 wherein the low-calorie cereals are desaccharized cereals obtained by removal by extraction of saccharide in the cereals after cooking.
7. Calorie intake-controlling food according to any of Claims 1 - 6 wherein the water-soluble dietary fiber is carrageenan or guar gum.
8. Calorie intake-controlling food according to any of Claims 1 - 7 wherein the protein is casein or a salt thereof.
9. Calorie intake-controlling food according to any of Claims 1 - 8 containing seasonings.

10. Calorie intake-controlling food according to any of Claims 1 - 9 wherein the seasonings are one or more members selected from the group consisting of soy sauce, miso and sodium glutamate.

Patentansprüche

- 5 1. Nahrungsmittel zur gesteuerten Kalorienaufnahme, umfassend kalorienarme Getreideprodukte reduzierten Kohlenhydratgehalts, eine wasserlösliche Diätfaser und ein Protein eines isoelektrischen Punkts im sauren Bereich, wobei die Getreideprodukte in einer entsprechend der zu steuernden Kalorienaufnahme vorgegebenen Menge vorhanden sind und die wasserlösliche Diätfaser und das Protein in solchen
10 Mengen zugegeben sind, daß eine wäßrige Lösung des Nahrungsmittels beim In-Berührung-Gelangen mit Magensäure gelatiniert wird.
2. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach Anspruch 1, wobei das Gewichtsverhältnis wasserlösliche Diätfaser/Protein 1/0,5 bis 1/8 beträgt.
- 15 3. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach Anspruch 2, wobei das Gewichtsverhältnis wasserlösliche Diätfaser/Protein 1/0,5 bis 1/2 beträgt.
4. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach einem der Ansprüche 1 bis 3, wobei das
20 Verhältnis des Gesamtgewichts wasserlösliche Diätfaser + Protein/Gewicht der kalorienarmen Getreideprodukte 1/1 bis 100 beträgt.
5. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach Anspruch 1 in Schleimform.
- 25 6. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach Anspruch 1 oder 5, wobei die kalorienarmen Getreideprodukte aus durch extraktive Entfernung von in den Getreideprodukten enthaltenem Saccharid nach dem Kochen erhaltenen entzuckerten Getreideprodukten bestehen.
7. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach einem der Ansprüche 1 bis 6, wobei die
30 wasserlösliche Diätfaser aus Carrageenan oder Guargummi besteht.
8. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach einem der Ansprüche 1 bis 7, wobei das Protein aus Casein oder einem Salz desselben besteht.
- 35 9. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach einem der Ansprüche 1 bis 8, enthaltend Gewürze.
10. Nahrungsmittel zur gesteuerten Kalorienaufnahme nach einem der Ansprüche 1 bis 9, wobei die
40 Gewürze aus Sojasoße, Miso und/oder Natriumglutamat bestehen.

Revendications

1. Aliment de contrôle de l'apport calorique, qui comprend des céréales hypocaloriques ayant une teneur
45 réduite en glucides, une fibre alimentaire hydrosoluble et une protéine ayant un point isoélectrique dans le domaine acide, les céréales étant contenues en une quantité prédéterminée correspondant à l'apport calorique à contrôler et ladite fibre alimentaire hydrosoluble et ladite protéine étant en des proportions telles qu'une solution aqueuse dudit aliment est gélatinisée lors du contact avec le suc gastrique.
- 50 2. Aliment de contrôle de l'apport calorique selon la revendication 1, dans lequel le rapport pondéral de la fibre alimentaire hydrosoluble à la protéine est compris entre 1:0,5 et 1:8.
3. Aliment de contrôle de l'apport calorique selon la revendication 2, dans lequel le rapport pondéral de la fibre alimentaire hydrosoluble à la protéine est compris entre 1:0,5 et 1:2.
- 55 4. Aliment de contrôle de l'apport calorique selon l'une quelconque des revendications 1 à 3, dans lequel le rapport du poids total de la fibre alimentaire hydrosoluble et de la protéine au poids des céréales hypocaloriques est compris entre 1:1 et 100.

5. Aliment de contrôle de l'apport calorique selon la revendication 1, qui se trouve sous forme de gruau.

6. Aliment de contrôle de l'apport calorique selon la revendication 1 ou 5, dans lequel les céréales hypocaloriques sont des céréales désaccharisées, obtenues par enlèvement par extraction du saccharide dans les céréales après la cuisson.

7. Aliment de contrôle de l'apport calorique selon l'une quelconque des revendications 1 à 6, dans lequel la fibre alimentaire hydrosoluble est la carragénine ou la gomme de guar.

8. Aliment de contrôle de l'apport calorique selon l'une quelconque des revendications 1 à 7, dans lequel la protéine est de la caséine ou un sel de cette dernière.

9. Aliment de contrôle de l'apport calorique selon l'une quelconque des revendications 1 à 8, contenant des condiments.

10. Aliment de contrôle de l'apport calorique selon l'une quelconque des revendications 1 à 9, dans lequel les condiments sont un ou plusieurs des éléments sélectionnés dans le groupe constitué par la sauce de soja, le miso et le glutamate de sodium.

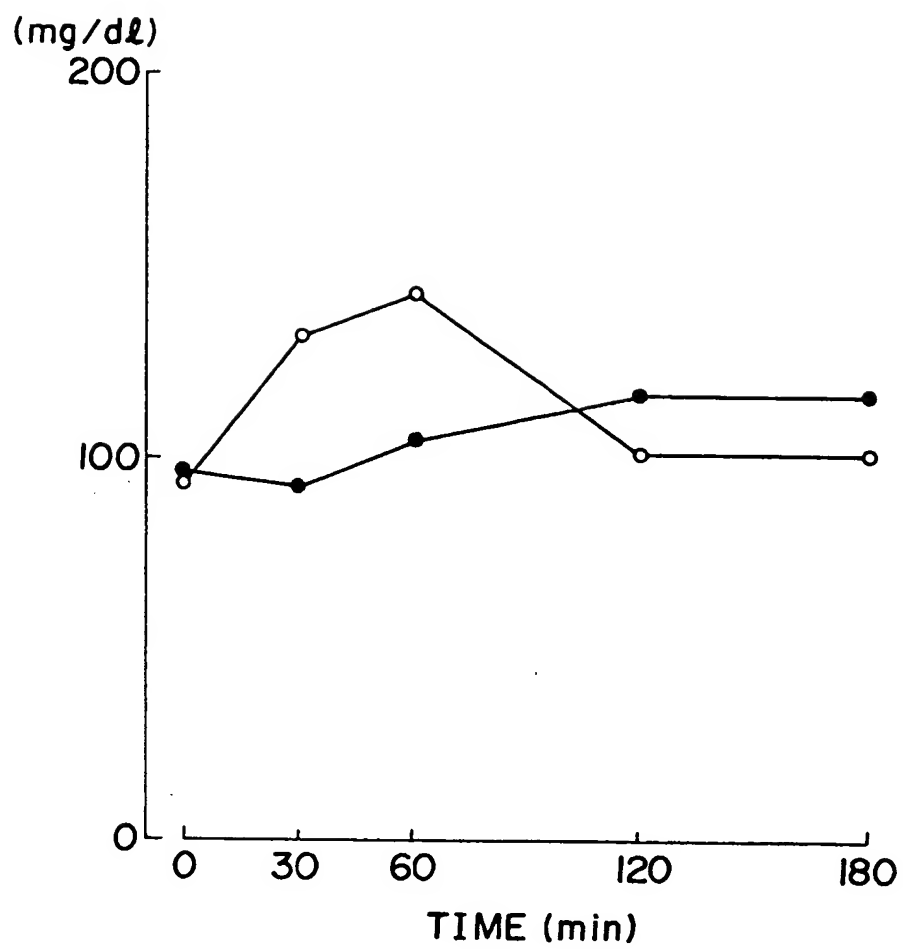


FIG. 1